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EXAMINER
SWERDLOW, DANIEL

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/788,267	Applicant(s) ZENG ET AL.	
	Examiner Daniel Swerdlow	Art Unit 2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *32* is/are allowed.

6)☒ Claim(s) *1-7,11-16,18-22,25,26,28,29,31 and 33-37* is/are rejected.

7)☒ Claim(s) *8-10,17,23,24,27 and 30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *7,8* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The corrected or substitute drawings were received on 2 April 2001. These drawings are acceptable.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 6, 11, 15, 20, 22 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Szechenyi (US Patent 5,271,037).

4. Claim 1 claims a method of identifying crosstalk in a received signal comprising collecting received data corresponding to the received signal from a receiver. Szechenyi discloses crosstalk compensation comprising utilizing (i.e., collecting) a control signal (Fig. 1, reference RSV; column 2, lines 61-66) that corresponds to the received data claimed. Claim 1 further claims the method comprises collecting primary data from a primary transmitter. Szechenyi discloses utilizing (i.e., collecting) a receiving line signal (Fig. 1, reference EL1; column 3, lines 59-61) that corresponds to the primary data claimed. Claim 1 further claims the method comprises collecting crosstalk data from a crosstalk transmitter. Szechenyi discloses

utilizing (i.e., collecting) a reference signal (Fig. 1, reference R1(1); column 2, lines 43-52) that corresponds to the crosstalk data claimed. Claim 1 further claims the method comprises identifying a crosstalk function corresponding to the crosstalk data. Szechenyi discloses an adaptive filter (Fig. 1, reference F1; column 3, lines 26-28) that simulates the crosstalk signal (i.e., identifies the crosstalk function) associated with the reference signal that corresponds to the crosstalk data claimed. Therefore, Szechenyi anticipates all elements of Claim 1.

5. Claim 6 claims the method of Claim 1 further comprising collecting a plurality of sets of crosstalk data from a plurality of crosstalk transmitters, including a first set of crosstalk data from a first crosstalk transmitter. As stated above apropos of Claim 1, Szechenyi anticipates all elements of that claim. In addition, Szechenyi discloses collecting a plurality of reference signals (Fig. 1, reference R(1)1, R(1)2, R(1)N that correspond to the crosstalk signals claimed from a plurality of transmitting circuits (Fig. 1, reference S1, S2, SN) that correspond to the crosstalk transmitters claimed, including a first reference signal from a first transmitting circuit (Fig. 1, reference R(1)1, S1). Claim 6 further claims identifying a crosstalk function corresponding to the first set of crosstalk data. Szechenyi discloses an adaptive filter (Fig. 1, reference F1; column 3, lines 26-28) that simulates the crosstalk signal (i.e., identifies the crosstalk function) associated with the reference signal that corresponds to the first crosstalk data claimed. Therefore, Szechenyi anticipates all elements of Claim 6.

6. Claim 11 claims the method of Claim 1 further comprising provisioning communications lines in a DSL system in which the identified crosstalk function is identified. As stated above apropos of Claim 1, Szechenyi anticipates all elements of that claim. In addition, Szechenyi

discloses use of the crosstalk compensation in a digital (i.e., DSL) system (column 1, lines 14-17). Therefore, Szechenyi anticipates all elements of Claim 11.

7. Claim 15 claims a system for identifying crosstalk comprising a first transmitter to transmit a first signal. Szechenyi discloses crosstalk compensation equipment comprising a receiving line signal (Fig. 1, reference EL1; column 3, lines 59-61) that is inherently produced by a transmitter that corresponds to the first transmitter claimed. Claim 15 further claims the system comprises a second transmitter configured to transmit a second signal. Szechenyi discloses a transmitting circuit (Fig. 1, reference S1; column 2, lines 30-34) that corresponds to the second transmitter claimed and produces a signal on a transmission line (Fig. 1, reference SL1; column 2, lines 39-43) that corresponds to the second signal claimed. Claim 15 further claims the system comprises a receiver configured to receive a combined signal comprising the first signal and crosstalk interference from the second signal. Szechenyi discloses an analog to digital converter (Fig. 1, reference AD; column 3, lines 8-13) that corresponds to the receiver claimed and receives the receiving line signal that corresponds to the combined signal claimed and comprises the signal that corresponds to the first signal claimed and crosstalk from the transmission line signal that corresponds to the second signal claimed (column 3, lines 29-32). Claim 15 further claims the system comprises a processor. Szechenyi discloses a crosstalk compensation circuit (Fig. 1, reference KS; column 2, lines 26-30) that corresponds to the processor claimed. Claim 15 further claims the processor comprises a data collector in communication with the first transmitter, the second transmitter and the receiver to collect a data set corresponding to each signal. Szechenyi discloses receiving data via communication between the crosstalk compensation circuit that correspond to the processor claimed and the transmitter that

corresponds to the first transmitter claimed (Fig. 1, reference EL1), the transmitting circuit that corresponds to the second transmitter claimed (Fig. 1, reference R(1)1) and the analog to digital converter that corresponds to the receiver claimed (Fig. 1, reference S, + input). Claim 15 further claims the processor comprises a crosstalk identifier connected to the data collector comprising a crosstalk response estimator configured to estimate the crosstalk interference in the combined signal. Szechenyi discloses an adaptive filter (Fig. 1, reference F1; column 3, lines 26-28) that corresponds to the crosstalk response estimator claimed and simulates (i.e., estimates) the crosstalk from the transmission line signal that corresponds to the second signal claimed in the receiving line signal that corresponds to the combined signal claimed. Therefore, Szechenyi anticipates all elements of Claim 15.

8. Claim 20 claims the system of Claim 15 wherein the first transmitter and the receiver are part of a DSL communication system. As stated above apropos of Claim 15, Szechenyi anticipates all elements of that claim. In addition, Szechenyi discloses use of the crosstalk compensation in a digital (i.e., DSL) communication system (column 1, lines 14-17). Therefore, Szechenyi anticipates all elements of Claim 20.

9. Claim 22 claims the system of Claim 15 wherein the first transmitter, the second transmitter and the receiver are modems. As stated above apropos of Claim 15, Szechenyi anticipates all elements of that claim. In addition, Szechenyi discloses use of the crosstalk compensation with line equipment including transmitting and receiving circuits (i.e., modems) (column 1, lines 14-17). Therefore, Szechenyi anticipates all elements of Claim 22.

10. All elements of Claim 25 are comprehended by Claim 15. Claim 25 is rejected for the reasons stated above apropos of Claim 15.

11. Claims 33 and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Terry (US Patent 6,055,297).

12. Claim 33 claims a method of dynamically managing spectra in a DSL system. Terry discloses a method crosstalk reduction that adjusts power spectral densities (PSD's) (i.e., manages spectra) (column 2, lines 41-45) in an ongoing manner (i.e., dynamically) (column 2, lines 57-59) in a DSL system (column 1, lines 32-37). Claim 33 further claims the method comprises identifying crosstalk functions and characteristics in the DSL system. Terry discloses determining PSD's due to crosstalk (i.e., identifying crosstalk functions and characteristics) (column 2, lines 41-46). Claim 33 further claims the method comprises transferring information concerning the identified crosstalk functions and characteristics to an entity controlling spectra in the DSL system and controlling line spectra in modems in the DSL system. Terry discloses monitoring (i.e., transferring information concerning the identified crosstalk functions and characteristic) and adjusting PSD (i.e., controlling line spectra) performed centrally by a separate computer that corresponds to the entity claimed (column 7, lines 58-64). Therefore, Terry anticipates all elements of Claim 33.

13. Claim 34 claims the method of Claim 33 wherein controlling includes adjusting spectra in the DSL system to reduce crosstalk interference. As stated above apropos of Claim 33, Terry anticipates all elements of that claim. In addition, Terry discloses adjusting PSD's (i.e., spectra) to reduce overlap (i.e., crosstalk) (column 2, lines 45-46). Claim 34 further claims coordinating the use of spectra in the DSL system. Terry discloses central control (i.e., coordination) of PSD's (column 7, lines 58-64). Therefore, Terry anticipates all elements of Claim 34.

14. Claims 36 and 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Bremer (US Patent 6,160,790).

15. Claim 36 claims a method of transmitter coordination comprising identifying crosstalk functions affecting a plurality of transmitted signals on a plurality of transmission lines. Bremer discloses a crosstalk canceller system comprising crosstalk cancellers (Fig. 5, reference 21; column 6, lines 32-38) that generate a cancellation signal from a transmit signal (i.e., identify crosstalk functions) affecting a plurality of transmitted signals (Fig. 5, reference 23) on a plurality of transmission lines (Fig. 5, reference 13). Claim 36 further claims the method comprises synchronizing the transmitted signals. Bremer discloses synchronization of transmitters and transmit symbols (i.e., signals) (column 10, lines 26-29). Claim 36 further claims the method comprises coordinating the transmitted signals to reduce crosstalk. Bremer discloses synchronization (i.e., coordination) of transmitters to cancel (i.e., reduce) crosstalk (column 10, lines 30-32). Therefore, Bremer anticipates all elements of Claim 36.

16. Claim 37 claims a method of receiver coordination comprising identifying crosstalk functions affecting a plurality of signals on a plurality of transmission lines. Bremer discloses a crosstalk canceller system comprising crosstalk cancellers (Fig. 5, reference 21; column 6, lines 32-38) that generate a cancellation signal from a transmit signal (i.e., identify crosstalk functions) affecting a plurality of transmitted signals (Fig. 5, reference 23) on a plurality of transmission lines (Fig. 5, reference 13). Claim 37 further claims the method comprises synchronizing the signals. Bremer discloses synchronization of transmitters and transmit symbols (i.e., signals) (column 10, lines 26-29). Claim 37 further claims the method comprises

reducing crosstalk among the signals using digital signal processing. Bremer discloses canceling (i.e., reducing) crosstalk using DSP (i.e., digital signal processing) (column 10, lines 30-32). Therefore, Bremer anticipates all elements of Claim 37.

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

18. Claims 2, 7, 16 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szechenyi in view of Sands (US Patent 6,134,283).

19. Claim 2 claims the method of Claim 1 further comprising determining a first estimate of a timing offset between the received data and the crosstalk data. As stated above apropos of Claim 1, Szechenyi anticipates all elements of that claim. Therefore, Szechenyi anticipates all elements of Claim 2 with the exception of determining a first estimate of a timing offset between the received data and the crosstalk data. Sands discloses computing an alignment error estimate (i.e., determining a first estimate of a timing offset) (column 6, lines 23-25) to synchronize receivers (i.e., receive data) and transmitters (column 6, lines 3-8) utilizing crosstalk interference levels (i.e., crosstalk data). It would have been obvious to one skilled in the art at the time of the invention to apply received data and crosstalk data alignment error estimation as taught by Sands to the crosstalk compensation taught by Szechenyi for the purpose of further reducing crosstalk.

20. Claim 7 claims the method of Claim 6 further comprising determining a first estimate of a timing offset between the received data and the crosstalk data. As stated above apropos of Claim 6, Szechenyi anticipates all elements of that claim. Therefore, Szechenyi anticipates all elements of Claim 7 with the exception of determining a first estimate of a timing offset between the received data and the crosstalk data. Sands discloses computing an alignment error estimate (i.e., determining a first estimate of a timing offset) (column 6, lines 23-25) to synchronize receivers (i.e., receive data) and transmitters (column 6, lines 3-8) utilizing crosstalk interference levels (i.e., crosstalk data). It would have been obvious to one skilled in the art at the time of the invention to apply received data and crosstalk data alignment error estimation as taught by Sands to the crosstalk compensation taught by Szechenyi for the purpose of further reducing crosstalk.

21. Claim 16 claims the system of Claim 15 wherein the crosstalk identifier further comprises a first timing offset estimator configured to calculate a first estimate of a timing offset between the combined signal and the reference signal. As stated above apropos of Claim 15, Szechenyi anticipates all elements of that claim. Therefore, Szechenyi anticipates all elements of Claim 16 with the exception of a first timing offset estimator configured to calculate a first estimate of a timing offset between the combined signal and the reference signal. Sands discloses computing an alignment error estimate (i.e., determining a first estimate of a timing offset) (column 6, lines 23-25) to synchronize receivers (i.e., combined signal) and transmitters (column 6, lines 3-8) utilizing crosstalk interference levels (i.e., reference signals). It would have been obvious to one skilled in the art at the time of the invention to apply received data and crosstalk data alignment error estimation as taught by Sands to the crosstalk compensation taught by Szechenyi for the purpose of further reducing crosstalk.

22. All elements of Claim 26 are comprehended by Claim 16. Claim 26 is rejected for the reasons stated above apropos of Claim 16.

23. Claims 3, 18 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szechenyi in view of Sands and further in view of Pfeil et al. (US Patent 6,160,511).

24. Claim 3 claims the method of Claim 2 wherein determining the first estimate of the timing offset comprises cross-correlating the received data and the crosstalk data if the timing offset is other than zero. As stated above apropos of Claim 2, the combination of Szechenyi and Sands makes obvious all elements of that claim. Therefore, the combination makes obvious all elements of Claim 3 with the exception of determining the first estimate of the timing offset comprising cross-correlating the received data and the crosstalk data. Pfeil discloses using cross-correlation to find timing offset (column 5, lines 56-58). It would have been obvious to one skilled in the art at the time of the invention to apply cross-correlation as taught by Pfeil to the combination made obvious by Szechenyi and Sands for the purpose of further finding the timing offset.

25. Claim 18 claims the system of Claim 16 wherein the first timing offset estimator comprises a cross-correlator configured to perform a cross-correlation of the combined signal and the second signal to provide the first timing offset. As stated above apropos of Claim 16, the combination of Szechenyi and Sands makes obvious all elements of that claim. Therefore, the combination makes obvious all elements of Claim 18 with the exception of a cross-correlator configured to perform a cross-correlation of the combined signal and the second signal to provide the first timing offset. Pfeil discloses using cross-correlation to find timing offset

(column 5, lines 56-58). It would have been obvious to one skilled in the art at the time of the invention to apply cross-correlation as taught by Pfeil to the combination made obvious by Szechenyi and Sands for the purpose of finding the timing offset.

26. All elements of Claim 28 are comprehended by Claim 18. Claim 28 is rejected for the reasons stated above apropos of Claim 18.

27. Claims 4, 19 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szechenyi in view of Gitlin (US Patent 4,995,104).

28. Claim 4 claims the method of Claim 1 wherein identifying the crosstalk function comprising performing an estimation from the group comprising a standard least-squares estimation and a weighted least squares estimation. As stated above apropos of Claim 1, Szechenyi anticipates all elements of that claim. In addition, Szechenyi discloses simulating (i.e., estimating) the crosstalk function using adaptive filters with coefficients determined by means of known algorithms (column 3, lines 23-38). Therefore, Szechenyi anticipates all elements of Claim 4 with the exception of estimation from the group comprising a standard least-squares estimation and a weighted least squares estimation. Gitlin discloses use of least-squares estimation to estimate an interference (i.e., crosstalk) function (column 4, lines 39-44). It would have been obvious to one skilled in the art at the time of the invention to apply least-squares estimation as taught by Gitlin to the crosstalk compensation taught by Szechenyi for the purpose of providing the adaptive filtering algorithm.

29. Claim 19 claims the system of Claim 15 wherein the crosstalk identifier comprises a least-squares estimator. As stated above apropos of Claim 15, Szechenyi anticipates all elements

of that claim. In addition, Szechenyi discloses simulating (i.e., estimating) the crosstalk function using adaptive filters with coefficients determined by means of known algorithms (column 3, lines 23-38). Therefore, Szechenyi anticipates all elements of Claim 19 with the exception of a least-squares estimator. Gitlin discloses use of least-squares estimation to estimate an interference (i.e., crosstalk) function (column 4, lines 39-44). It would have been obvious to one skilled in the art at the time of the invention to apply least-squares estimation as taught by Gitlin to the crosstalk compensation taught by Szechenyi for the purpose of providing the adaptive filtering algorithm.

30. All elements of Claim 29 are comprehended by Claim 19. Claim 29 is rejected for the reasons stated above apropos of Claim 19.

31. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Szechenyi in view of Gitlin and further in view of Sands.

32. Claim 5 claims the method of Claim 4, wherein performing an estimation includes jointly determining an estimate of the timing offset between the received data and the crosstalk data and identifying a crosstalk function corresponding to the crosstalk data. As stated above apropos of Claim 4, the combination of Szechenyi and Gitlin makes obvious all elements of that claim. In addition, as stated above apropos of Claim 1, Szechenyi discloses identifying a crosstalk function corresponding to the crosstalk data. Therefore, the combination makes obvious all elements of Claim 5 with the exception of determining an estimate of the timing offset between the received data and the crosstalk data. As stated above apropos of Claim 2, Sands discloses computing an alignment error estimate (i.e., determining a first estimate of a timing offset) (column 6, lines 23-

25) to synchronize receivers (i.e., receive data) and transmitters (column 6, lines 3-8) utilizing crosstalk interference levels (i.e., crosstalk data). It would have been obvious to one skilled in the art at the time of the invention to apply received data and crosstalk data alignment error estimation as taught by Sands to the crosstalk compensation taught by Szechenyi for the purpose of further reducing crosstalk.

33. Claims 11 through 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szechenyi.

34. Claim 11 claims the method of Claim 1 further comprising provisioning communications lines in a DSL system in which the identified crosstalk function is identified. As stated above apropos of Claim 1, Szechenyi anticipates all elements of that claim. In addition, Szechenyi discloses use of the crosstalk compensation in a digital communications system (column 1, lines 14-17). DSL systems were well-known digital communications systems. It would have been obvious to one skilled in the art at the time of the invention to apply the crosstalk compensation disclosed by Szechenyi to a DSL system for the purpose of reducing crosstalk. Further, provisioning communication lines in a DSL system was well known. It would have been obvious to one skilled in the art at the time of the invention to provision DSL lines in the crosstalk compensated DSL system made obvious by Szechenyi for the purpose of providing DSL service to new customers.

35. Claim 12 claims the method of Claim 1 further comprising performing DSL system diagnosis services in a DSL system in which the identified crosstalk function is identified. As stated above apropos of Claim 1, Szechenyi anticipates all elements of that claim. In addition,

Szechenyi discloses use of the crosstalk compensation in a digital communications system (column 1, lines 14-17). DSL systems were well-known digital communications systems. It would have been obvious to one skilled in the art at the time of the invention to apply the crosstalk compensation disclosed by Szechenyi to a DSL system for the purpose of reducing crosstalk. Further, performing DSL system diagnosis services in a DSL system was well known. It would have been obvious to one skilled in the art at the time of the invention to performing DSL system diagnosis services in the crosstalk compensated DSL system made obvious by Szechenyi for the purpose of resolving network problems.

36. Claim 13 claims the method of Claim 1 further comprising providing DSL system maintenance services in a DSL system in which the identified crosstalk function is identified. As stated above apropos of Claim 1, Szechenyi anticipates all elements of that claim. In addition, Szechenyi discloses use of the crosstalk compensation in a digital communications system (column 1, lines 14-17). DSL systems were well-known digital communications systems. It would have been obvious to one skilled in the art at the time of the invention to apply the crosstalk compensation disclosed by Szechenyi to a DSL system for the purpose of reducing crosstalk. Further, providing DSL system maintenance services in a DSL system was well known. It would have been obvious to one skilled in the art at the time of the invention to perform DSL system diagnosis services in the crosstalk compensated DSL system made obvious by Szechenyi for the purpose of resolving network problems.

37. Claims 14, 21 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szechenyi in view of Terry.

38. Claim 14 claims the method of Claim 1 further comprising performing spectral management services for a DSL system in which the identified crosstalk function is identified. As stated above apropos of Claim 1, Szechenyi anticipates all elements of that claim. In addition, Szechenyi discloses use of the crosstalk compensation in a digital communications system (column 1, lines 14-17). DSL systems were well-known digital communications systems. It would have been obvious to one skilled in the art at the time of the invention to apply the crosstalk compensation disclosed by Szechenyi to a DSL system for the purpose of reducing crosstalk. Therefore, Szechenyi makes obvious all elements of Claim 14 with the exception of performing spectral management services. Terry discloses determining PSD for a communications system (i.e., performing spectral management services) (column 2, lines 41-46). It would have been obvious to one skilled in the art at the time of the invention to apply spectral management as taught by Terry to the crosstalk compensated DSL network made obvious by Szechenyi for the purpose of further reducing crosstalk.

39. Claim 21 claims the system of Claim 15 wherein the processor is located at a location remote from the transmitters and the receiver. As stated above apropos of Claim 15, Szechenyi anticipates all elements of that claim. Therefore, Szechenyi anticipates all elements of Claim 21 with the exception of the processor being located at a location remote from the transmitters and the receiver. Terry discloses monitoring PSD (i.e., identifying crosstalk) performed centrally by a separate (i.e., located at a remote location) computer that corresponds to the identifier claimed (column 7, lines 58-64). It would have been obvious to one skilled in the art at the time of the invention to apply remote crosstalk identification as taught by Terry to the crosstalk

compensation taught by Szechenyi for the purpose of reducing cost by having a single controller for multiple sites.

40. Claim 31 claims the identifier of Claim 29 wherein the identifier is configured to be used at a third party site remote from the transmitters and the receivers. As stated above apropos of Claim 29, Szechenyi anticipates all elements of that claim. Therefore, Szechenyi anticipates all elements of Claim 31 with the exception of the identifier being configured to be used at a third party site remote from the transmitters and the receivers. Terry discloses monitoring PSD (i.e., identifying crosstalk) performed centrally by a separate (i.e., configured to be used at a third party remote site) computer that corresponds to the identifier claimed (column 7, lines 58-64). It would have been obvious to one skilled in the art at the time of the invention to apply remote crosstalk identification as taught by Terry to the crosstalk compensation taught by Szechenyi for the purpose of reducing cost by having a single controller for multiple sites.

41. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Terry in view of Szechenyi. Claim 35 claims the method of Claim 33 wherein identifying includes the steps of Claim 1. As stated above apropos of Claim 33, Terry anticipates all elements of that claim. Therefore, Terry anticipates all elements of Claim 35 with the exception of the steps of Claim 1. As stated above apropos of Claim 1, Szechenyi teaches all elements of that claim. It would have been obvious to one skilled in the art at the time of the invention to apply crosstalk compensation as taught by Szechenyi to the crosstalk reduction taught by Terry for the purpose of canceling crosstalk that could not be removed by PSD management.

Allowable Subject Matter

42. Claim 32 is allowed.

43. The following is an examiner's statement of reasons for allowance:

44. Claim 32 claims a method for identifying crosstalk in a received signal caused by interference from a crosstalk signal comprising collecting received data corresponding to the received signal from a receiver during a specified time period. Szechenyi discloses crosstalk compensation comprising utilizing (i.e., collecting) a control signal (Fig. 1, reference RSV; column 2, lines 61-66) that corresponds to the received data claimed. Claim 32 further claims the method comprises collecting primary data from a primary transmitter during the specified time period. Szechenyi discloses utilizing (i.e., collecting) a receiving line signal (Fig. 1, reference EL1; column 3, lines 59-61) that corresponds to the primary data claimed. Claim 32 further claims the method comprises collecting crosstalk data from a crosstalk transmitter during the specified time period. Szechenyi discloses utilizing (i.e., collecting) a reference signal (Fig. 1, reference R1(1); column 2, lines 43-52) that corresponds to the crosstalk data claimed. Further, Szechenyi discloses a digitally controlled process that inherently takes place during a specified time period. Claim 32 further claims subtracting the primary data from the received data to generate interference data, determining a first estimate of a timing offset between the received signal and the first crosstalk signal, comprising cross-correlating the interference data and the crosstalk data and identifying a crosstalk function corresponding to the crosstalk signal comprising performing a least-squares estimation to identify the crosstalk function and the crosstalk signal using the interference data and the first estimate of the timing offset. Szechenyi discloses simulating (i.e., estimating) the crosstalk function using adaptive filters with

coefficients determined by means of known algorithms (column 3, lines 23-38) and Gitlin discloses use of least-squares estimation to estimate an interference (i.e., crosstalk) function (column 4, lines 39-44) and Pfeil discloses use of cross-correlation to find timing offset (column 5, lines 56-58). However, neither Szechenyi, Gitlin nor Pfeil discloses subtracting the primary data from the received data to generate interference data, determining a first estimate of a timing offset between the received signal and the first crosstalk signal, comprising cross-correlating the interference data and the crosstalk data and using the timing offset and the interference signal to estimate the crosstalk function. As such, the prior art fails to anticipate or make obvious subtracting the primary data from the received data to generate interference data, determining a first estimate of a timing offset between the received signal and the first crosstalk signal, comprising cross-correlating the interference data and the crosstalk data and using the timing offset and the interference signal to estimate the crosstalk function. Therefore, Claim 32 is allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

45. Claims 8 through 10, 17, 23, 24, 27 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

46. The following is a statement of reasons for the indication of allowable subject matter:

47. Claim 8 claims the method of Claim 1 further comprising collecting a plurality of sets of crosstalk data corresponding to strong and weak crosstalk signals. As stated above apropos of Claim 1, Szechenyi anticipates all elements of that claim. In addition, Szechenyi discloses collecting a plurality of reference signals (Fig. 1, reference R(1)1, R(1)2, R(1)N that correspond to the crosstalk signals claimed from a plurality of transmitting circuits (Fig. 1, reference S1, S2, SN) that correspond to the crosstalk transmitters claimed. Claim 8 further claims determining whether a timing offset exists between the received data and the strong crosstalk data and generating an estimate of the offset. Sands discloses computing an alignment error estimate (i.e., determining a timing offset) (column 6, lines 23-25) to synchronize receivers (i.e., receive data) and transmitters (column 6, lines 3-8) utilizing crosstalk interference levels (i.e., crosstalk data). Claim 8 further claims identifying a strong crosstalk function. As stated above apropos of Claim 1, Szechenyi discloses identifying a crosstalk function. Claim 1 further claims subtracting the strong crosstalk from the received signal to generate a modified received signal, determining whether a timing offset exists between the received data and the weak crosstalk signals, generating a first estimate of the offset and identifying a weak crosstalk function. Szechenyi discloses identifying a crosstalk functions for multiple disturbing lines (i.e., lines with stronger or weaker crosstalk signals) and the alignment error estimate discloses by Sands is also applied to multiple line systems (column 10, lines 35-42). Therefore the combination makes obvious all elements of Claim 8 with the exception of subtracting the strong crosstalk from the received signal to generate a modified received signal. As such, the prior art fails to anticipate or make

obvious subtracting the strong crosstalk from the received signal to generate a modified received signal. Therefore, Claim 8 is allowable matter.

48. Claim 9 claims the method of Claim 2 further comprising subtracting the primary data from the received data prior to determining the first estimate of the timing offset between the received data the crosstalk data. As stated above apropos of Claim 2, the combination of Szechenyi and Sands makes obvious all elements of that claim. Therefore, the combination makes obvious all elements of Claim 9 with the exception of subtracting the primary data from the received data prior to determining the first estimate of the timing offset between the received data the crosstalk data. As such, the prior art fails to anticipate or make obvious subtracting the primary data from the received data prior to determining the first estimate of the timing offset between the received data the crosstalk data. Therefore, Claim 9 is allowable matter.

49. Claim 10 claims the method of Claim 1 further comprising performing multiuser detection using the identified crosstalk function. As stated above apropos of Claim 1, Szechenyi anticipates all elements of that claim. Therefore Szechenyi anticipates all elements of Claim 10 with the exception of performing multiuser detection using the identified crosstalk function. As such, the prior art fails to anticipate or make obvious performing multiuser detection using the identified crosstalk function. Therefore, Claim 10 is allowable matter.

50. Claim 17 claims the system of Claim 16 wherein the crosstalk response estimator is configured to calculate a second estimate of the timing offset. As stated above apropos of Claim 16, the combination of Szechenyi and Sands makes obvious all elements of that claim. Therefore, the combination makes obvious all elements of Claim 17 with the exception of calculating a second estimate of the timing offset. As such, the prior art fails to anticipate or

make obvious calculating a second estimate of the timing offset. Therefore, Claim 17 is allowable matter.

51. Claim 23 claims the system of Claim 15 wherein the processor further comprises a data conditioner connected to the data collector to resample collected data. As stated above apropos of Claim 15, Szechenyi anticipates all elements of that claim. Therefore Szechenyi anticipates all elements of Claim 23 with the exception of a data conditioner connected to the data collector to resample collected data. As such, the prior art fails to anticipate or make obvious a data conditioner connected to the data collector to resample collected data. Therefore, Claim 23 is allowable matter.

52. Claim 24 claims the system of Claim 15 wherein the crosstalk identifier further comprises a data subtractor configured to subtract the first signal from the combined signal to generate an interference signal. As stated above apropos of Claim 15, Szechenyi anticipates all elements of that claim. Therefore Szechenyi anticipates all elements of Claim 24 with the exception of a data subtractor configured to subtract the first signal from the combined signal to generate an interference signal. As such, the prior art fails to anticipate or make obvious a data subtractor configured to subtract the first signal from the combined signal to generate an interference signal. Therefore, Claim 24 is allowable matter.

53. Claim 27 is essentially similar to Claim 17 and is allowable matter for the reasons stated above apropos of Claim 17.

54. Claim 30 is allowable matter due to dependence from Claim 27.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Swerdlow whose telephone number is 703-305-4088. The examiner can normally be reached on Monday through Friday between 8:00 AM and 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forrester Isen can be reached on 703-305-4386. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

ds
July 17, 2003

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